17. One factory F_1 produces 1000 articles 20 of them being defective, second factory F_2 produces 4000 articles, 40 of them being defective and third factory F_3 produces 5000 articles, 50 of them being defective. All these articles are put in one stock pile. One of them is chosen and is found to be defective. What is the probability that it is from the factory F_1?

18. In a normal distribution, 31% of the items are under 45 and 8% are over 64. Find the mean and variance of the distribution.

19. Two independent sample of sizes 9 and 7 form a normal population had the following values of the variables.

Sample I :	18	13	12	15	12	14	16	14	15
Sample II :	16	19	13	16	18	13	13		

Is the difference between the means of the sample significant?

20. The following table gives the number of refrigerators sold by 4 salesmen in three months.

Month	Salesman			
	A	B	C	D
I	50	40	48	39
II	46	48	50	45
III	39	44	40	39

(a) Is there is a significant difference in the sale made by the four salesman?

(b) Is there is a significant difference in the sales made during different month?

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APRIL/MAY 2025

CACS42/FACS42 — STATISTICAL METHODS AND THEIR APPLICATIONS — II

Time : Three hours Maximum : 75 marks

SECTION A — ($10 \times 2 = 20$ marks)

Answer ALL the questions.

1. Define curve fitting.

2. Write down the normal equations of fitting a straight line.

3. Define conditional probability.

4. State Chebychev's inequality.

5. Define binomial distribution.

6. If X is Poisson variate with parameter 1. Find $P(X = 4)$.

7. Define Null hypothesis.

8. Write down the applications of t distribution.

9. What is ANOVA?

10. Give the one way classification table.

SECTION B — (5 × 5 = 25 marks)

Answer ALL the questions.

11. (a) Fit the curve $y = bx^a$ to the following data.

x	1	2	3	4	5	6
y	1200	900	600	200	110	50

Or

(b) Fit a straight line to the following data :

x	0	1	2	3	4
y	2.1	3.5	5.4	7.3	8.2

12. (a) If A and B are two events such that $P(A+B)=\frac{3}{4}$, $P(AB)=\frac{1}{4}$ and $P(\overline{A})=\frac{2}{3}$, find $P(B)$.

Or

(b) From the pack of 52 cards two cards are drawn the first being replaced before the second is drawn. Find the probability that the first is a diamond and the second is a king.

13. (a) A discrete random variable X has the mean 6 and variance 2. If it is assumed that the distribution is binomial, find the probability that $5 \le X \le 7$.

Or

(b) Fit a Poisson distribution to the following data and calculate the theoretical frequencies :

x	0	1	2	3	4
y	123	59	14	3	1

14. (a) A sample of heights of 6400 English men has a mean of 170 cm and a S.D. of 6.4 cm, while a simple sample of heights of 1600 Americans has a mean of 172 cm and S.D. of 6.3 cm. Do the data indicate that Americans are on the average, taller than the Englishmen?

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Or

(b) A certain injection administered to each of 12 patients resulted in the following increases of blood pressure 5, 2, 8, –1, 3, 0, 6, –2, 1, 5, 0, 4. Can it be concluded that the injection will be in general accompanied by an increase in B.P.?

15. (a) Explain the method of analysis the results of one-way classification using ANOVA Table.

Or

(b) Discuss the Randomized block design.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Fit a second degree parabola to the following data

x	0	1	2	3	4
y	1	5	10	22	38